Repair instructions

ROTOFIX 32

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Andreas Hettich GmbH & Co. KG • Föhrenstraße 12 • D-78532 Tuttlingen • Germany
Phone: (07461) 705-0 • Fax: (07461) 705-125 • Internet: www.hettichlab.com • e-mail: info@hettichlab.com, service@hettichlab.com

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Contents

1. Introduction 5
2. Description of the centrifuge 6
2.1 Control panel A3 7
2.2 Power board A1 7
2.3 Motor M1 8
2.4 Speed sensor B3 8
2.5 Brake resistor (R1) and overtemperature fuse (F3) 8
2.6 Lid lock Y1 8
2.7 Imbalance switch S 2 8
3. Troubleshooting procedures 9
4. Error messages 10
4.1 MAINS RESET 10
4.2 Brief description 10
4.3 Description and elimination of errors 11
4.4 Defects without Error indications. 16
5. Settings and enquiries 18
5.1 Setting the machine version 18
5.2 Enquiry the machine version 18
5.3 Enquiry the programme versions 19
5.4 Brake setting 19
5.5 Lid lock control 20
5.6 Imbalance switch-off 20
6. Functional check after a repair 21
7. Speedometer-code-position of the rotor 22
8. Assembling and disassembling components 23
8.1 Speed sensor (Tacho) B3 24
8.2 Motor M1 / Rubber-metal bearing 24
8.3 Power board A1 24
8.4 Control panel (A3) 24
8.5 Brake resistor (BR) R1 24
8.6 Overtemperature fuse F3 25
8.7 Flat ribbon cable 25
8.8 Appliance plug with mains switch 25
8.9 Exchange mains fuse 25
8.10 Imbalance switch (S2) 25
8.11 Lid lock Y1 25

9. Circuit diagrams 26
9.1 Circuit diagram and plug assignment 27
9.2 Signals and test results 28
9.2.1 Speed sensor (Tacho) B3 28
9.2.2 Motor 28
9.2.3 Brake resistor R1 and overtemperature fuse F3 29
9.2.4 Lid lock Y1 29
9.2.5 Imbalance switch 30
9.2.6 Intermediate voltage on power board A1 30
10. Technical data 31
11. Skeleton construction of ROTOFIX 32 32
12. Index 33

1 Introduction

- This repair instruction is only intended for specialized staff authorized by HETTICH.

> ⚠ Interventions and modifications at centrifuges, which have been conducted by persons not authorized by HETTICH, are at their own risk and entail the loss off all guarantee and liability claims. In such an event any guarantee claim or liability claim against the HETTICH expire.

- The aim of these repair instructions is to enable any errors to be located and eliminated quickly.

> ⚠ There should be no interventions at, or replacement of components on the individual electronics boards. Experience shows that if an intervention is not performed in accordance with regulations, or if a component is installed whose specification is not identical to that of the original component, then the error (defect) which has occurred will be compounded by further damage. In such an event any guarantee claim or liability claim against the HETTICH ceases to exist.
> Any electronics boards which are not repaired in accordance with the regulations cannot be acknowledged as being replacement spare parts.

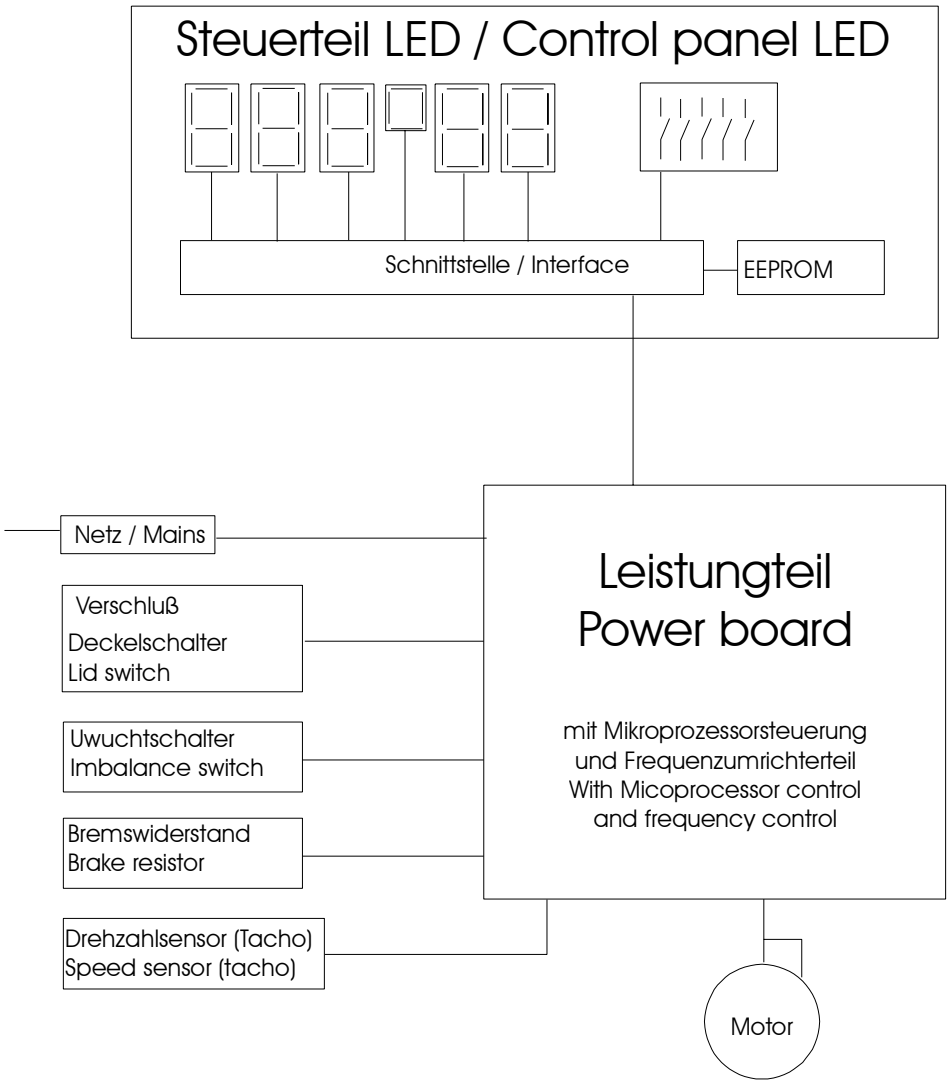
- Information about the operation of the centrifuge please see operating instructions.
- We reserve all rights for these technical documents.
- Technical alterations reserved.

2 Description of the centrifuge

The ROTOFIX 32 is a microprocessor-controlled centrifuge which is comprised of the following electrical components:

- Control panel
- Power board
- Motor
- Speed sensor (Tacho)
- Brake resistor with overtemperature fuse
- Lid lock system
- Imbalance switch

All electronic components are on mains, due to the DC-coupling



2.1 Control panel A3

The control panel have only restricted control tasks, it disposes of the following characteristics:

- Input panel for operation parameters
- Indication elements
- Transmission of the signals to the power board via the interface.
- Storing the machine version and the brake setting.
  By means of the machine version the power board is informed which kind of centrifuge has to be controlled. Then the power board takes the corresponding values from the ROM.
  e.g. Max. Speed
  Acceleration and deceleration ramps
- Communication with the power board via TTL interface.

The power supply for the control panel is transmitted via the flat ribbon cable:
Pin 1 GND
Pin 4 +5V

2.2 Power board A1

The power board is a combination of:

- Control panel
- Voltage supply
- Frequency converter

The power board carries out the following tasks:

- Power supply 15 V, DC for imbalance switch and speed sensor
- Power supply 5 V, DC for control panel
- Generating the motor power supply.
  (three-phase current with variable frequency and voltage)
  Functional description: The mains supply is rectified, smoothened and chopped into a pulse width pattern in three bridge elements with a microprocessor.
- Slot for motor with integrated overtemperature switch
- Monitoring the motor current
- Evaluating the overtemperature switch in the motor
- Slot for imbalance switch
- Evaluating the imbalance switch
- Slot for brake resistor
- Triggering the brake resistor
- Slot for speed sensor
- Evaluating the speed sensor pulses (6 per revolution)
- Evaluating the rotor code information
- Slot for lid lock
- Triggering the lid lock magnet at stand still of the rotor
- Evaluating the message line lid lock open/closed
- Communication with the control panel via TTL interface
- Error evaluation

2.3 Motor M1

- The motor is a three- phase asynchronous motor with two pairs of poles.
- The motor is protected against overheating by an overtemperature switch.
- The power board evaluates the overtemperature switch.
- The motor is controlled by the power board with a three-phase current with variable frequency and voltage.

2.4 Speed sensor B3

- The speed sensor (speedometer) which is screwed onto the motor receives
  - the rotor code information and
  - the speed information (6 pulses per revolution)

  from the magnets of the tacho ring attached to the rotor.
- The speed of the rotor is monitored and controlled by the power board

2.5 Brake resistor (R1) and overtemperature fuse (F3)

- The braking copper which is integrated on the power board transfers the electrical energy produced during braking, from a voltage of 380 V with the 230 V version and 203 V with the 120 V version, to the brake resistor in a controlled manner.
- An overtemperature fuse protects the brake resistor against overheating. When the overtemperature fuse (F3) blows, the power board will be separated from the power supply.

2.6 Lid lock Y1

- Opening of the lid lock is prevented by a latch. The lid lock can only be opened when the relay REL 602 on the power board is energised. This occurs when the rotor is at standstill and mains power is applied. The solenoid is energized and releases the latch.
- The centrifuge can only be started when the lid is closed. A microswitch on the lid lock detects the position of the lid lock (open/closed) and report it to the power board.

2.7 Imbalance switch S 2

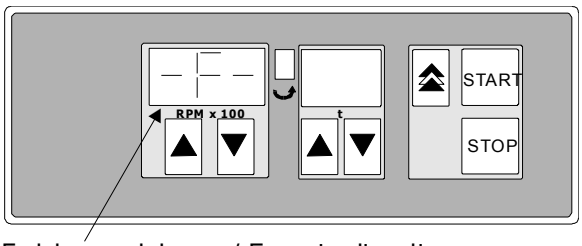
- A switch (break contact) detects any imbalance.
- Imbalance can only be detected in running mode (starting, centrifuging and braking).
- If any imbalance is detected, the drive is changed over to braking.

3 Troubleshooting procedures

- Fuses in installation in which centrifuge is installed are intact.
- Mains input fuses of centrifuge are intact.
- Supply voltage present at (see circuit diagram):
  - Connecting cable
  - Appliance plug
  - Mains switch
  - Power board A1, plug S402L and S402N
- Look for the displayed error code in the chapter "Error messages".
- Remedy the error according to the instructions.
- Carry out a functional check after every repair and whenever a component is replaced, see chapter "Functional check after a repair".

4 Error messages

The error message will be indicated in the speed display of the front panel.
e.g. :



Fehlermeldung / Error indication

4.1 MAINS RESET

- Switch off the mains switch.
- Wait at least for 10 seconds and then switch on the mains switch again.

4.2 Brief description

Display.	Fault	Brief description	Page
- 1 -	Tacho error	Tacho pulses break down during the run	11
- 2 -	System reset	Mains interrupt	11
- 3 -	Imbalance	Imbalance on the motor axis	11
- 4 -	Communication	Communication error	12
- 5 -	Overload	Fault in the motor or the motor control	12
- 6 -	Overvoltage	Mains is out of the toleranc	12
- 8 -	Undervoltage	Mains is out of the toleranz	13
- 9 -	overtemperature	Overtemperature switch in the motor release	13
	Versions Error	No indication in the speed display Machine version misadjusted.	16
- c -	Controller-Watchdog	Fault in power board	14
- d -	Lid lock error	Fault in lid lock system	14
- E -	Short circuit	Short circuit in power board	14
- F -	Rotor code	No rotor code signals	15
rot…	New rotor identified	New rotor was installed	15

4.3 Description and elimination of errors

– 1 – Tacho error

Error	Tacho pulses break down during the run.
Error consequence	Drive switch off and brakes with the adjusted brake level.
Error cause	• Speed sensor (tacho) defective • Power board (A1) defective • Loosen contact in plug S502
Measurement	1. A1 / S502 pin 2 (GND) to pin 3 ($+U_B$) 2. Speed sensor plug S502 , pin 4 – pin 2 GND (pulses: 0V, 15V, 0V, 15V etc. / 6 pulses per revolution). See also section 9.2
Error code reset	Wait for a time duration of 120 sec. after this perform a MAINS RESET.

– 2 – System reset

Error	Mains interrupt during a run
Error consequence	Drive switch off and brakes with the adjusted brake level.
Error cause	• Power supply has failed • Loosen contact in electrical connections
Error code reset	1. Wait for rotor stand still 2. Open the lid and press key START or perform a MAINS RESET

– 3 – Imbalance

Error	Imbalance on motor axle
Error consequence	Drive switch off and brakes with the adjusted brake level
Error cause	• Weight difference in rotor components. • Supporting lugs not greased. • Imbalance switch is defective or not connected. • Imbalance switch disadjusted (Adjustment see chapter "Imbalance switch-off"). • Loose contact in cable or plug S503 • Power board (A1) is defective
Measurement	Plug S503 Pin 1 to Pin 4 of imbalance switch Switch is a opener. See also chapter "9.2.5".
Error code reset	Open the lid after standstill

– 4 – Communication

Error	Communication error between control board and power board
Error consequence	Drive switch off . No brake effective
Error cause	• Loose contact in flat ribbon cable • Control board (A3) defective • Power board (A1) defective
Error code reset	MAINS RESET after stand still. If the MAINS RESET performed before stand still, the target speed will be indicated in the display until standstill.

– 5 – Overload

Error	Power board detects overload
Error consequence	Drive switches off. No brake effective
Error cause	• Power board (A1) defective • Motor defective (to low impedance or motor bearings are defective)
Measurement	Measure motor coil, see chapter 9.2.
Error code reset	Perform a MAINS RESET after standstill

– 6 – Overvoltage

Error	Overvoltage in intermediate circuit. This error normally only occur when the drive is being braked
Error consequence	Drive switches off. No brake effective
Error cause	• Power board (A1) defective • Brake resistor defective
Measurement	Measure intermediate voltage, see chapter 9.2.6
Error code reset	Perform a MAINS RESET after standstill.

– 8 – Undervoltage

Error	Mains voltage less than 20% as nominal voltage.
Error consequence	Drive switches off. No brake effective
Error cause	• Mains voltage too less • Power board (A1) defective
Measurement	Check the mains voltage Measure intermediate voltage, see chapter 9.2.6
Error code reset	Perform a MAINS RESET after standstill.

– 9 – Overtemperature

Error	Overtemperature in the motor indicated.
Error consequence	Drive switches off. No brake effective
Error cause	• Motor defective • Power board (A1) defective • Overtemperature switch in motor defective • Loosen contact in plug S401 Pin 4 or 5
Measurement	Remove plug S401 and measure between Pin 4 and 5 : Switch closed: $\approx 0\ \Omega$ OK Switch open: $\infty\ \Omega$ defective See also chapter 9.2.
Error code reset	Perform a MAINS RESET after standstill.

– c – Controller-Watchdog

Error	Watchdog in power board Discrepancy in program procedure
Error consequence	Drive switches off. No brake effective
Error cause	• Power board (A1) defective
Error code reset	Perform a MAINS RESET after standstill.

– d – Lid lock error

Error	Lid lock is open during centrifugation.
Error consequence	Drive switches off. No brake effective
Error cause	• Micro switch on lid lock is defective. • Power board (A1) defective. • Loosen contact in Plug S404 Pin 5 and 6. • Mechanical defect at the lid lock • Emergency release active during run.
Measurement	Remove plug S404 and measure between Pin 5 and 6 : Lid closed: $\approx 0\ \Omega$ Lid open: $\infty\ \Omega$ See also section 9.2.
Error code reset	Perform a MAINS RESET after standstill.

– E – Short circuit

Error	Power board detects short circuit Current consumption too high
Error consequence	Drive switches off. No brake effective
Error cause	• Power board (A1) defective
Error code reset	Perform a MAINS RESET after standstill.

- F - Rotor code

Error	No rotor code after start-up.
Error consequence	Drive switches off after 15 sec. No brake effective
Error cause	• Start-up took place without the rotor. • Motor is defective. • Power board (A1) defective Speed sensor (speedometer) defective, or loose contact on plug.
Measurement	1. A1 / S502 pin 2 (GND) to pin 3 ($+U_B$) 2. Speed sensor plug S502 , pin 4 – pin 2 GND (pulses: 0V, 15V, 0V, 15V etc. / 6 pulses per revolution). See also section 9.2
Error code reset	Perform a MAINS RESET after standstill.

rot... – New rotor identified

Each time a centrifuging run is started, the centrifuge recognises the rotor code of the installed rotor with the help of a sensor. This means that the nominal speed of the installed rotor cannot be exceeded.

After the identification of a newly installed rotor the drive will cut off and its rotor code "rot ..." will be displayed. Example: rot 3 = rotor code 3.

Press the START key.

If the speed rating of the newly installed rotor is lower than the last speed entered, the speed rating of the newly installed rotor will be displayed.

If the speed rating of the newly installed rotor is higher than the last speed entered, the last speed entered will be displayed.

Press the START key to start the centrifugation run.

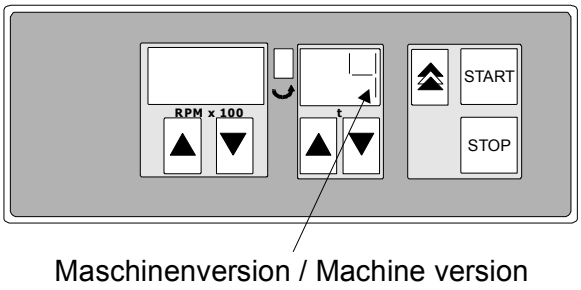
4.4 Defects without Error indications

No speed indication / Machine-Version-Error

Error: The centrifuge stops after few seconds and the speed display extinguished and in the time display appears the set machine version.

Error cause:
- Wrong machine version adjusted

Example for indication:



Maschinenversion / Machine version

Proceed as the following:

1. Adjust the correct machine version by using the ▲ and ▼ arrow keys in the time area.

   ROTOFIX 32 = 4
   MIKRO 20 = 2
   EBA 20 = 1
2. Press the key STOP in order to store the set machine version.
3. Perform a MAINS RESET.

The lid can not be opened

Error: The lid can not be opened.
The rotation display indicates "Lid opened", but the lid is closed.

Error cause:
- Micro switch at lid lock is defective
- Loosen contact on plug S404 / Pin 5 and 6
- Power board A1 defective
- Jumper for lid lock control is set on power board (A1), see chapter 5.5

Measurement: Remove plug S404 and measure between Pin 5 and 6:
Switch closed: $\approx 0\ \Omega$
Switch opened: $\infty\ \Omega$
See also section 9.2.4.

Error code reset: Release the lid by using the emergency release.

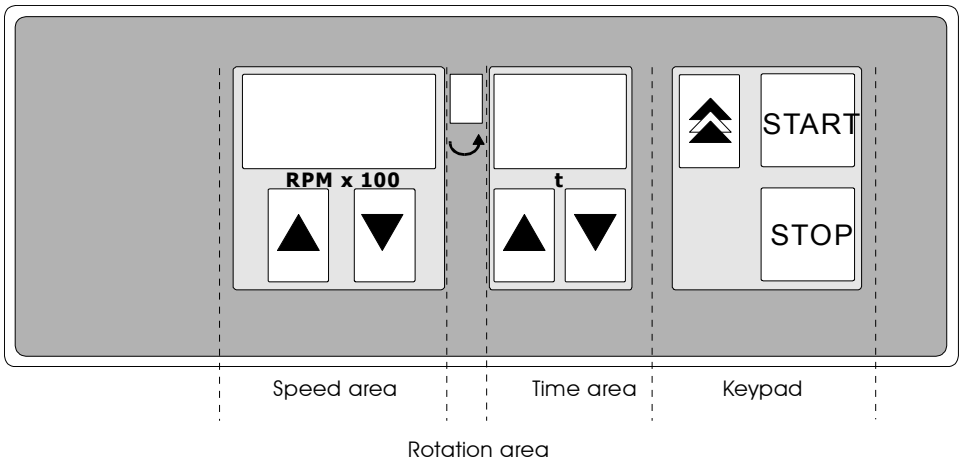
The lid can not be opened

Error	The lid can not be opened The rotation display indicates "Lid closed" and the lid is closed.
Error cause	• Solenoid on lid lock is defective • Loosen contact on plug S404 / Pin 1 and 3 • Power board (A1) defective • Jumper for lid lock control is set on power board (A1), see chapter 5.5
Measurement	Remove Plug S404 and measure between Pin 1 and 3: Solenoid ok: $\approx$ 5.7 kΩ Solenoid defective: ∞ Ω See also section 9.2.4.
Error code reset	Release the lid by using the emergency release.

No display

Error	No power supply on control board, no display
Error consequence	No operation possible
Error cause	• No mains supply • Power board (A1) defective • Control panel (A3) defective • Flat ribbon cable to control panel (A3) defective • Overtemperature fuse F3 defective
Measurement	1. Mains supply power board A1 S402L to S402N 2. Power board A1 S501 Pin 1 (GND) to S501 Pin 4 (+5V) 3. Control panel A3 S502 Pin 1 (GND) to S502 Pin 4 (+5V) 4. Overtemperature fuse F3. Remove plug S405 and measure directly at both flat connections of the overtemperature fuse: Fuse OK : $\approx$ 0 Ω Fuse defective: ∞ Ω. See also section 9.2.3.

5 Settings and enquiries



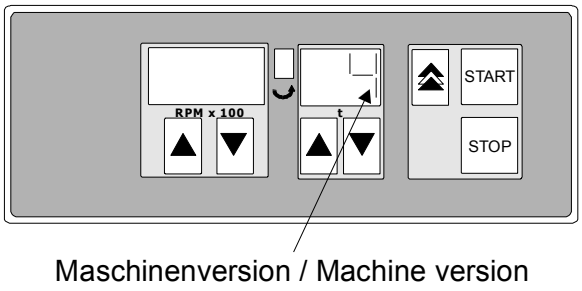
5.1 Setting the machine version

The machine version stored in the control panel must correspond to the centrifuge model. Control panels supplied as spare part are already set to machine version 4 (ROTOFIX 32).

If another machine version than 4 is set in the control panel, the set machine version will appear in the display after switching on the centrifuge ROTOFIX 32.

The machine version 4 must be set as follows:

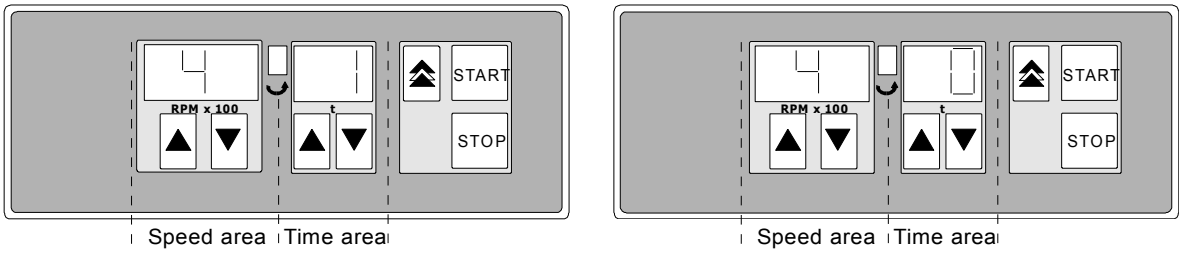
1. Adjust the machine version 4 by using the ▲ and ▼ arrow keys in the time area.



2. Press the key STOP in order to store the set machine version.

5.2 Enquiry the machine version

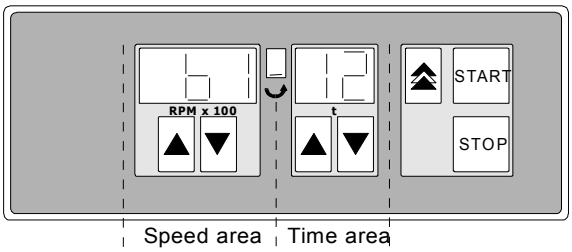
1. Switch off the mains switch.
2. Simultaneously press the pulse key ⏫ and the arrow key ▲ in the speed area. Switch on the mains switch and release the keys again.
3. If necessary press the key ▲ so often until the machine version appears in the speed area and the brake setting appears in the time area.



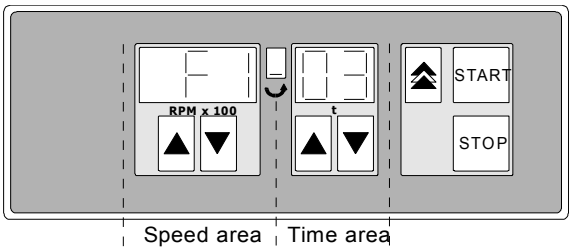
4. To exit the machine version display press the key STOP or perform a MAINS-RESET.

5.3 Enquiry the programme versions

1. Switch off the mains switch.
2. Simultaneously press the pulse key ⏫ and the arrow key ▲ in the speed area. Switch on the mains switch and release the keys again.
3. Press the key ▲ in the speed area so often until the programme version of the control panel (e.g. b1.12) is displayed.



4. Press the key ▲ in the speed area again.
   The programme version of the power board (e.g. F1.03) is displayed.

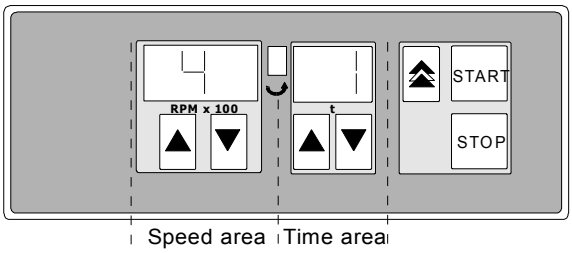


5. To exit the machine version display press the key STOP or perform a MAINS-RESET.

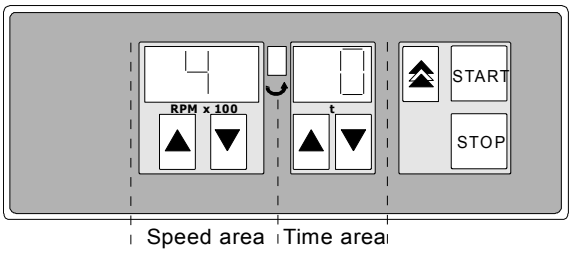
5.4 Brake setting

With this centrifuge, the braking effect can be set to normal or low.
This can be set before a run, as follows:

1. Switch off the mains switch.
2. Simultaneously press the pulse key ⏫ and the arrow key ▲ in the speed area. Switch on the mains switch and release the keys again.
3. If necessary press the key ▲ so often until the machine version appears in the speed area and the brake setting appears in the time area.



Normal braking effect “1”



Low braking effect “0”

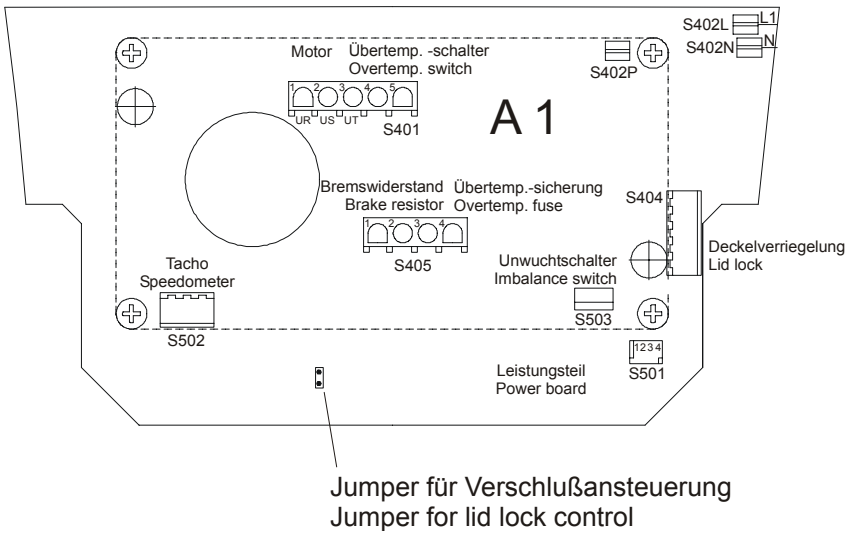
4. Set the required value, “1” or “0”, in the time area with the ▲ and ▼ arrow keys. For brake times see operating instructions chapter " Anhang/Appendix, Rotoren und Zubehör/Rotors and accessories ".
5. Confirm the set value with the STOP key.

5.5 Lid lock control

With the centrifuge ROTOFIX 32 the solenoid of the lid lock is energized automatically when the rotor is at standstill.

After the lid is opened the solenoid will drop out again.

With this kind of lid lock control, the jumper for the lid lock control on the power board (see below) may **not** be plugged.



5.6 Imbalance switch-off

The permissible imbalance is specified for rotor 1628 by the indication of the difference in weight of opposite rotor positions.

When having a difference in weight within the range of 4g to 8g during run-up, the drive has to switch off before reaching 1400 RPM.

The imbalance switch-off is adjusted by changing the distance of the imbalance switch.

With a test run with the indicated differences in weight the imbalance switch-off will be checked.

Adjusting the imbalance switch:

- Loosen both screws at the angle bracket of the imbalance switch on the outer part of the housing floor until you can shift it.
- Set the permissible imbalance by shifting the angle bracket.
- Tighten both screws at the angle bracket of the imbalance switch again.
- Check the imbalance switch-off with a test run.

6 Functional check after a repair

After a repair a functional check of the unit must be carried out. For functional check a test run with the loaded rotor must be performed.

During the test run the followings must be checked:

- Function of the keys, the display and the LEDs.
- Run-up and slow-down time, max. speed of the rotor. Values see operating instructions chapter "Anhang/Appendix, Rotoren und Zubehör/Rotors and accessories".
- Sample temperature. Values see operating instructions chapter "Anhang/Appendix, Rotoren und Zubehör/Rotors and accessories".
- Imbalance switch-off. Values see chapter "Imbalance switch-off".
- Current consumption. Values see chapter "Technical specification".

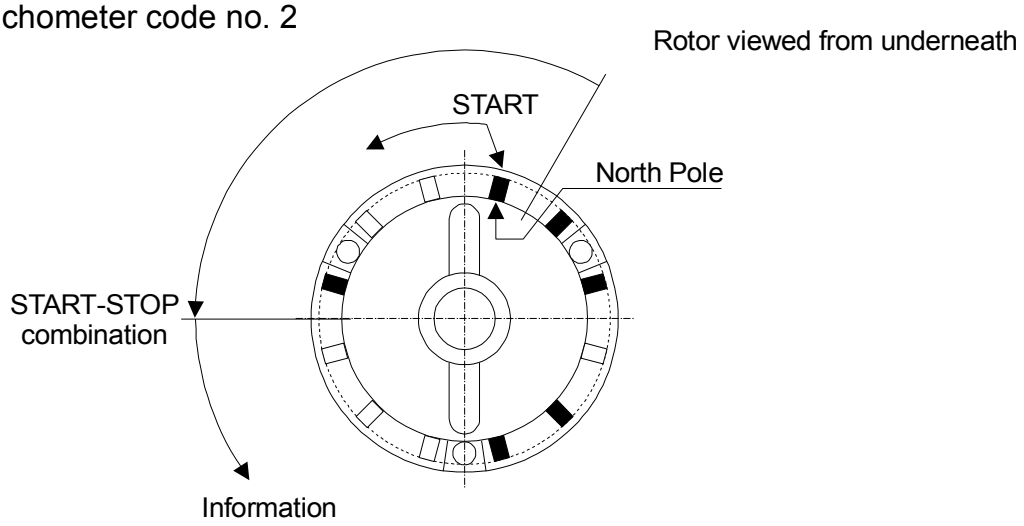
After the test run a safety test must be carried out. Check the following values:

• Insulation resistance	> 2	MΩ
• Protective conductor resistance	< 0.2	Ω
• Leakage current	< 3.5	mA *
	* limit according to EN 61010	

A laboratory centrifuge do not belong to those medical appliances which may be tested according to the regulation IEC 601 or corresponding national medical electronic standards. Laboratory centrifuges are classified as laboratory equipment.
The regulations applying to laboratory equipment are IEC 1010 or European standard EN 61010.

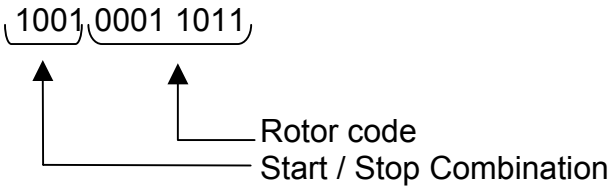
7 Speedometer-code-position of the rotor

Example: tachometer code no. 2



tachometer code determines: 1. maximum speed of rotor
2. run up and braking ramps
3. control response of electronics

Rotor



Tacho code-Nr.	Position occupied	Rotor
0	1001 0000 1111	
1	1001 0001 0111	1624, 1626, 1619, 1611
2	1001 0001 1011	1628, 1617
3	1001 0001 1101	1613
4	1001 0001 1110	1620A
5	1001 0100 0111	
6	1001 0101 0101	
7	1001 0101 0110	1648
8	1001 0101 1010	
9	1001 0110 0011	
10	1001 0111 0001	
11	1001 1000 0111	
12	1001 1000 1011	
13	1001 1000 1101	
14	1001 1000 0011	
15	1001 1100 0011	

The tacho code can be measured on plug S502, see also section 9.2

8 Assembling and disassembling components

Component	Abbreviation	Plug	Connected to	Description in chapter
Speed sensor	B3	S502	A1	8.1
Motor	M1	S401	A1	8.2
Rubber-metal bearing		--	--	8.2
Power board	A1	--	--	8.3
Control panel	A3	--	--	8.4
Flat ribbon cable			A1 to A3	8.7
Lid lock	Y1	S404	A1	8.11
Brake resistor	R1	S405	A1	8.5
Overtemperature fuse	F3	S405	A1	8.6
Mains switch	Q1	--	A1	8.8
Appliance plug	--	--	--	8.8
Imbalance switch	S1	S503	A1	8.10

Before assembling or disassembling components, the following working processes must first be carried out to reach the components.

Make a note of the plug numbers !

The components are assembled in reverse order !

- Open the lid
- Switch off the mains switch
- Disconnect the centrifuge from the mains
- Remove the rotor
- Remove the motor hood in the centrifuge chamber
- Remove the centrifuge chamber.

8.1 Speed sensor (Tacho) B3

- Remove the two fastening screw of the speed sensor.
- remove the speed sensor from the to of the motor
- Unplug the plug S502 from the power board
- remove the cable clip which fix the cable of the speed sensor on the motor.
- Exchange the speed sensor

8.2 Motor M1 / Rubber-metal bearing

- Remove the speed sensor, see section 8.1
- Unplug S401 from the power board
- Use a socket spanner to loosen and remove the three fastening nuts on lower end plate of motor.
- Lift motor upwards out of centrifuge and unplug the ground wire.
- Before the motor is installed, the three rubber-metal bearings must be checked for possible wear or cracks. These items must be replaced if necessary.
- Exchange the motor.
- Care must be taken of the anti-twist device when the rubber metal or motor being installed.

8.3 Power board A1

- Unplug all plugs and cables from the power board.
- Remove the two fastening screws of the power board
- Exchange the power board.
- Before installation, it must be noted that there is a heat-conducting paste between power board and centrifuge housing floor. Heat conduction from power board to centrifuge housing floor must be ensured.

Heat conduction from power board to centrifuge housing floor must be ensured.

8.4 Control panel A3

- Remove the two fastening screws and lift up the control panel carefully.
- Unplug the flat ribbon cable from the power board.
- Exchange the control panel.

8.5 Brake resistor R1

- Remove the two fastening screws.
- Unplug the two cable from the brake resistor.
- Exchange the brake resistor.

8.6 Overtemperature fuse F3

- Remove the two cables from the overtemperature fuse.
- Unscrew the fastening screws.
- Exchange the overtemperature fuse.

8.7 Flat ribbon cable

- Unplug the flat ribbon cable from the power board.
- Disassemble the control board from the housing(see section 8.4).
- Remove the three fastening screw on back side of the control panel.
- Lift off carefully the panel of the housing.
- Unplug the flat ribbon cable from the control board.
- Assemble in reverse order.

8.8 Appliance plug with mains switch

- Press the upper and the lower fastening clip and remove the appliance plug out of the housing
- Remove the plugs and the earth connection from the appliance plug.
- Remove the fuse holder, see chapter 8.9.
- Exchange the appliance plug.

8.9 Exchange mains fuse

- The fuse holder is placed in the appliance plug.
- Press the clip upward.
- Extract the fuse holder.
- Exchange the defective fuse.

8.10 Imbalance switch S2

- Unplug S503 from the power board.
- Remove the to fastening screws.
- Remove the cables at the imbalance switch.
- Exchange the complete imbalance switch.
- After mounting the imbalance switch, adjust it as described in chapter "Imbalance switch-off".

8.11 Lid lock Y1

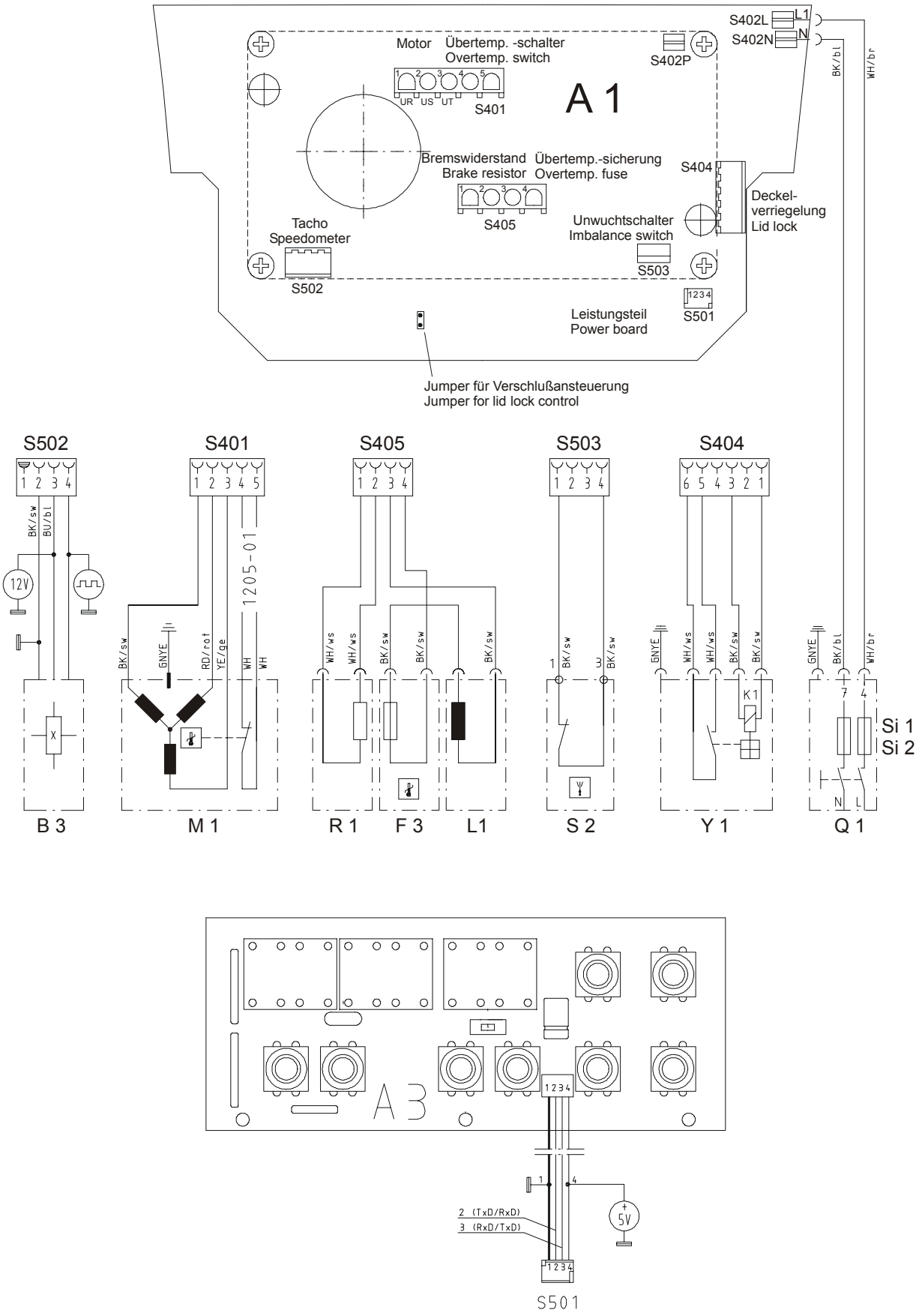
- Remove the two fastening screws on the top of the upper housing.
- Unplug the cable from the switch and the solenoid.
- Remove the earth connection from the lid lock.
- Exchange the lid lock.

9 Circuit diagrams

Used cable colours and their abbreviations:

Abbreviation	Colour
BK	black
BN	brown
BU	blue
GN/YE	green-yellow
GY	grey
RD	red
WH	white
YE	yellow

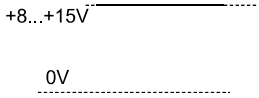
9.1 Circuit diagram and plug assignment



9.2 Signals and test results

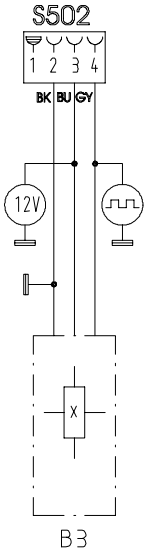
9.2.1 Speed sensor (Tacho) B3

Power supply:
Plug S502, measure between Pin 2 (GND)and 3:



Tacho signal:
Plug S502 measure between Pin 2 (GND) and 4:

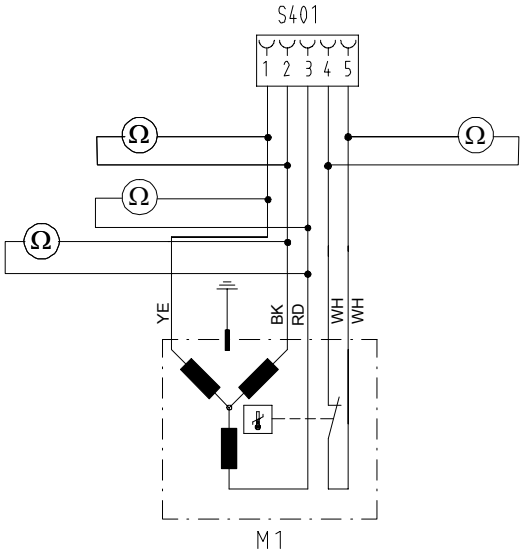
6 pulse per round



9.2.2 Motor

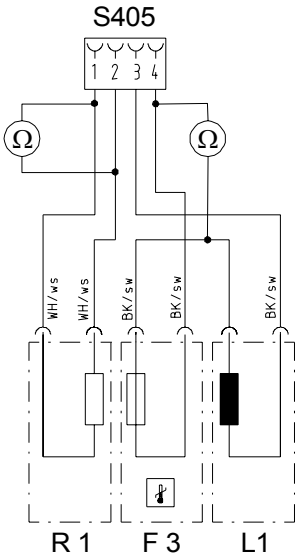
Motor coil
Remove plug S401 and measure between two lines:
230 V version: ≈ 6.8 Ω
120 V version: ≈ 1.7 Ω

Overtemperature switch
Remove plug S401 and measure between pin 4 and 5 :
Switch closed : ≈ 0 Ω
Switch released: ∞ Ω



9.2.3 Brake resistor R1 and overtemperature fuse F3

Brake resistor R1
Remove plug S405 and measure between pin 1 and 2 :
230 V Version: ≈ 330 Ω
120 V Version: ≈ 82 Ω

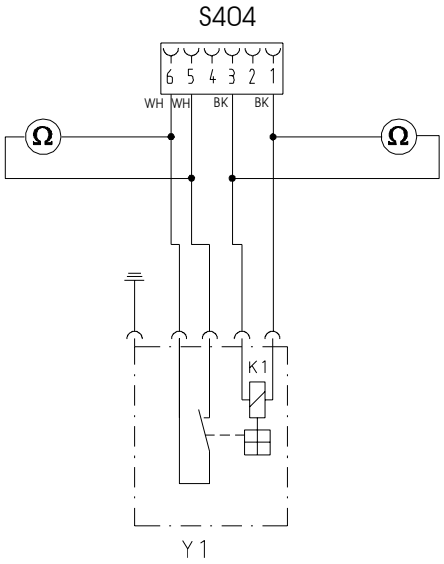


Overtemperature fuse F3
Remove plug S405 and measure directly at both flat connections of the overtemperature fuse:

Fuse OK : ≈ 0 Ω
Fuse defective: ∞ Ω

9.2.4 Lid lock Y1

Lid switch:
Remove plug S404 and measure between pin 5 and 6 :
Switch pressed : ≈ 0 Ω
Switch inoperative: ∞ Ω



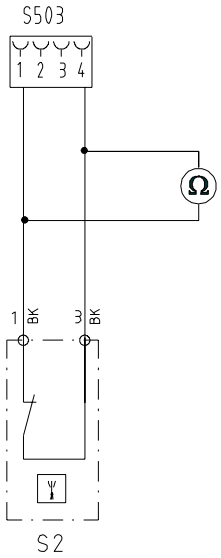
Lid lock solenoid K1
Remove plug S404 and measure between pin 1 and 3 :
230 V Version: ≈ 5,7 KΩ

9.2.5 Imbalance switch

Remove plug S503 and measure between pin 1 and pin 4 :

Switch pressed : $\infty\ \Omega$

Switch inoperative: $\approx 0\ \Omega$

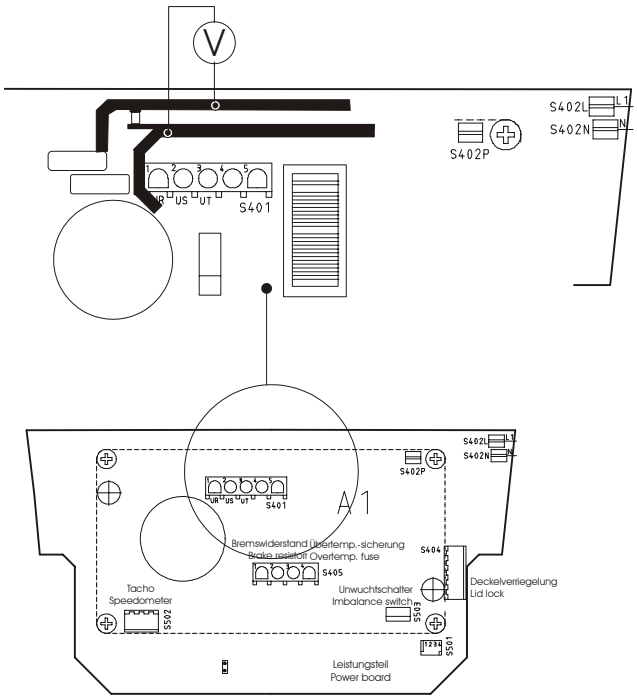


9.2.6 Intermediate voltage on power board A1

The intermediate voltage has to be measured during the run (run-up, run and run-down).

230 V version:
380 V DC

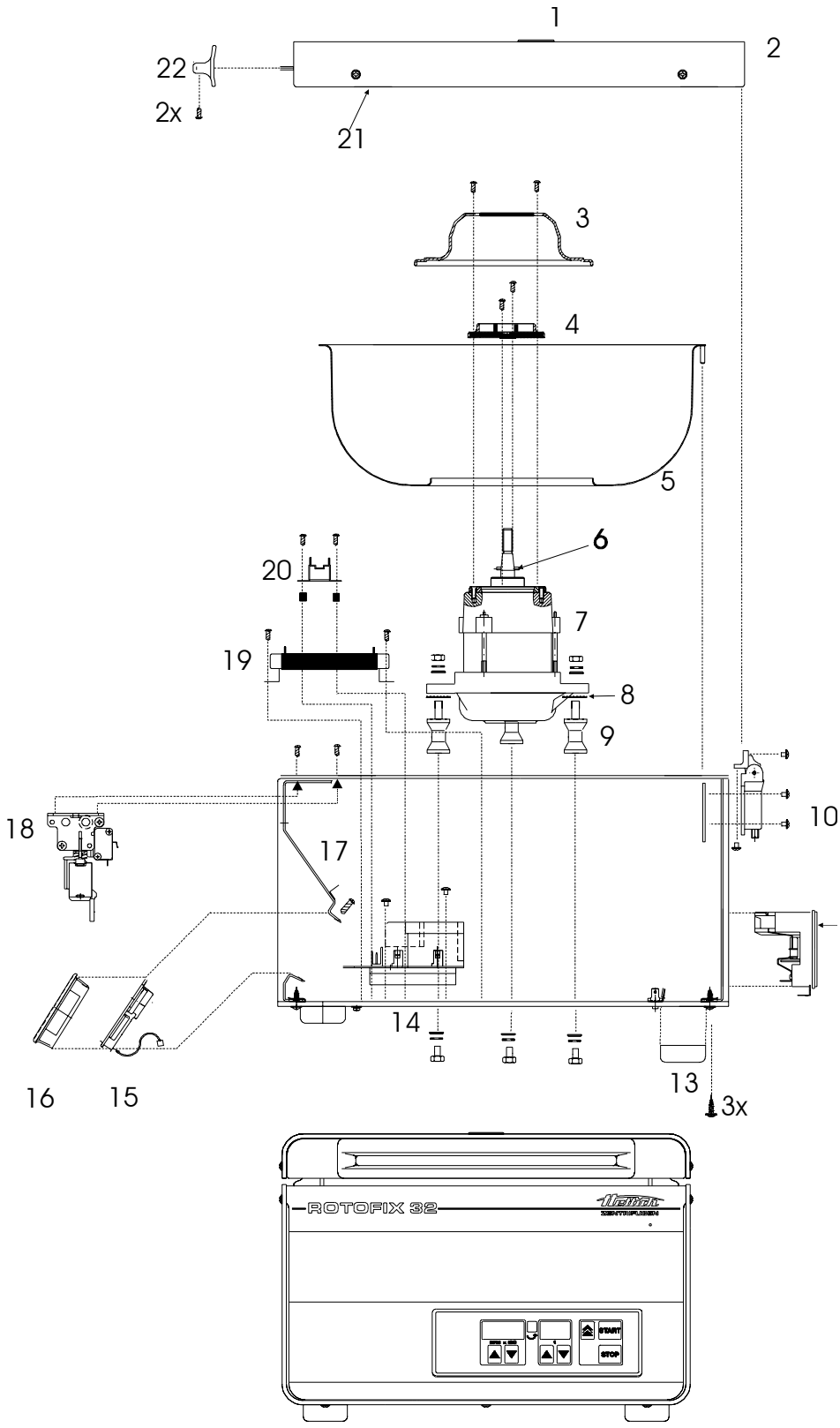
120 V version:
203 V DC



10 Technical specification

Hersteller / Manufacturer	Hettich Zentrifugen D-78532 Tuttlingen	
Typenbezeichnung / Model	ROTOFIX 32	
Verkaufs-Nr. / Product no.	1205, 1205-14	1205-01 1205-15
Netzspannung / Mains voltage (± 10%)	208 – 240 V 1~	100 – 127 V 1 ~
Netzfrequenz / Mains frequency	50 – 60 Hz	50 – 60 Hz
Anschlusswert / Connected load	300 VA	250 VA
Stromaufnahme / Current consumption	1.3 A	2.4 A
Kapazität max. / Max. capacity	4 x 100 ml	
zulässige Dichte / Max. density	1.2 kg/dm^3	
Drehzahl / Speed RPM	6000	
Beschlg. / Force RCF	4186	
Kinetische Energie / Kinetic energy	3000 Nm	
Prüfpflicht / Obligatory inspection	nein / no	
Aufstellungsort / Environment – Umgebungstemp. / Ambient temperature – relative Feuchte / Relative humidity	2°C bis 40°C / 2°C up to 40°C max. 80% bis 31°C, linear abnehmend bis zu 50% bei 40°C / max. 80% up to 31°C, descending in a linear pattern down to 50% at 40°C	
Geräteschutzklasse / Class of protection	I	
EMV / EMC – Störaussendung (Funkentstörung) / Emission (Radio interference suppression) – Störfestigkeit / Immunity	EN 55011 Gruppe 1, Klasse B / Group 1, Class B EN 61000-3-2 EN 61000-3-3 EN 61000-6-1	FCC Class B ----
Geräuschpegel (rotorabhängig) / Noise level (dependent on rotor)	≤ 65 dB(A)	
Abmessungen / Dimensions • Breite / Width • Tiefe / Depth • Höhe / Height	 368 mm 437 mm 261 mm	
Gewicht ca. / Weight approx.	15.6 kg	

11 Skeleton construction of ROTOFIX 32



1 Viewing window
2 Lid complete
3 Motor hood
4 Speed sensor (Tacho)
5 Chamber
6 Carrier pin
7 Motor
8 Anti-twist device
9 Rubber-metal bearing
10 Hinge
11 Fuse insert
12 Appliance plug
13 Rubber foot
14 Power board
15 Electronic control panel
16 Control panel complete
17 Housing
18 lid lock with magnet
19 Brake resistor
20 Overtemperature fuse
21 Lid insert
22 Handle for lid lock

12 Index

– 1 – Tacho error 11
– 2 – System reset 11
– 3 – Imbalance 11
– 4 – Communication 12
– 5 – Overload 12
– 6 – Overvoltage 12
– 8 – Undervoltage 13
– 9 – Overtemperature 13
– c – Controller-Watchdog 14
– d – Lid lock error 14
– E – Short circuit 14
- F - Rotor code 15
- rot... - New rotor identified 15

Appliance plug 25
Assembling 23

Brake resistor 8, 24, 29
Brake setting 19

Cable colours 26
Circuit diagram 27
Control panel 7, 24
Controller-Watchdog – c – 14

Description and elimination of errors 11
Disassembling 23

Enquiries 18
Error messages 10

Flat ribbon cable 25
Functional check 21

Imbalance 11
Imbalance switch 8, 25, 30
Imbalance switch-off 20
Intermediate voltage 30

Lid lock 8, 16, 17
Lid lock control 20
Lid lock solenoid 29
Lid lock Y1 25
Lid switch 29

Machine version 18
Machine-Version-Error 16
Mains fuse 25
mains switch 25
Motor 8, 24, 28
Motor coil 28

No display 17
No speed indication 16

Overtemperature fuse 8, 25, 29
Overtemperature switch 28

Permissible imbalance 20
Plug assignment 27
Power board 7, 24, 30

Settings 18
Signals 28
Skeleton construction 32
Speed sensor 8, 11, 15

Technical specification 31
Test results 28
The lid can not be opened 17